The Enriched Environment Studies

The Standard Experiment

At weaning age one rat from each of a dozen pairs of male twins is chosen randomly to go into an enriched environment (Environmentally Complex Treatment or ECT),while its twin is placed in an unstimulating environment (Isolated or Impoverished Condition or IC).

All twelve enriched pups live in one large cage—in a well-lighted, noisy, and busy laboratory. The cage is equipped with ladders, running wheels, and other rat toys. For 30 minutes each day, the rats are taken out and allowed to explore new territory. They are also petted, held, and talked to by various lab assistants. As they grow older, they are given various learning tasks to master, e.g., mazes to run, for which they are rewarded with bits of sugar. This training program continues for 80 days

The twelve impoverished animals live out their lives in solitary confinement, in a small cage with no toys in a quiet room with little light. Handling is minimal; there are no exploration sessions outside the cage, and no problems to solve.

Both have unlimited access to the same standard food.

At age 105 days, the time of reckoning is at hand. All rats are sacrificed, their brains dissected out, and analyzed morphologically and chemically.

In the tradition of good science, the "analyzers" have no idea of the background of the rats they are dissecting.

Results:

Enriched: Bulk of cortex is deeper and heavier. The increase in cortical mass is accounted for by an increase in the number of glia cells, increase in the size of the neuronal cell bodies and their nuclei, an increase in the diameters of the blood vessels supplying the cortex. Brain shows more acetylcholinesterase (the enzyme involved in the trans-synaptic conduction of neural impulses) and cholinesterase—the enzyme found in the glia cells. .

Impoverished: Relatively deteriorated brain—a brain with a thin and light cortex, lowered blood supply, diminished enzymatic activities, smaller neuronal cell bodies and nuclei, and few glia cells.

Conclusion:

A lack of adequate psychological enrichment results in palpable, measurable, and deteriorative changes in the brain's chemistry and anatomy.